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EXAMINER	
THOMAS, SHANE M	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/758,484	GRIFFIN ET AL.	
	Examiner	Art Unit	
	SHANE M. THOMAS	2186	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 May 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,4,6-16 and 36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,4,6-16 and 36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This Office action is responsive to the amendment filed 5/29/2008. Claims 1,3,4,6-16 and 36 are pending. Applicants' arguments and amendments to the claims have been carefully considered, but they are not persuasive and upon further consideration do not place the claims in condition for allowance. Accordingly, this action has been made FINAL.

Response to Amendments

All previously outstanding objections and rejections to the Applicant's disclosure and claims not contained in this Action have been respectfully withdrawn by the Examiner hereto.

Applicant's amendment has overcome the previous art rejections. Upon further search, the Examiner has cited the prior art reference of Ji to teach the newly amended limitations as discussed herein. Specifically, Ji teaches the ability of a snapshot system to create batch groups of updates that can be based on the timing intervals or size of the batch, as well as storing multiple sets of batched groups before completing the batch groups by transferring them to a snapshot storage (¶39).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1,6,8,10-15, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohran (U.S. Patent No. 7,296,125) in view of Armangua et al. (U.S. Patent No. 6,549,992) in further view of Ji et al. (U.S. Patent Application Publication No. 2004/0250029).

As per claim 1, Ohran teaches:

A method (figure 4) **for updating data at a backup system that tracks updates made to a primary system** (snapshots track changes made to a primary system over the course of time - see figure 2)**, the method comprising:**

In response to receiving a first update request from an application, creating a first group (collection of all changes made to the primary system from T0 - T1 - see figure 2; as some application, such as an operating system, is making changes to the data in order to create the updates on the primary system, the Examiner is considering that application or software element to be --an application--) **including a first plurality of update requests** (the Examiner is considering the collection of all updates that occur to the primary system from time T0 - T1 to be a "first plurality")**, the first plurality of update requests including the first update request** (all updates from T_0 to T_1 contain a plurality of updates, and therefore are being defined by the Examiner as containing the first update request);

Ohran does not specifically teach but Ji does teach:

in response to receiving a second update request from the application prior to completing the first plurality of update requests (Ji teaches that multiple batched update requests can be stored at the primary facility before being completed, or sent to the secondary facility, for backup - ¶40 and figure 3 - multiple batches in primary facility 102)**, creating a second group** (e.g. batch N+1 - figure 3, since Ji teaches that data of a limited number of requests will be collected into one batch group - ¶42) **including a second plurality of update requests** (as opposed to batch N's requests - ¶40)**, the second plurality of update requests including the second update request** (the next request after the previous batch has filled is being considered the second update request, which would have been included in the second plurality of request - ¶42)**.**

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have combined the backup system of modified Ohran with the teaching of using a predetermined size for the batch updates instead of a time interval (e.g. the T_0 to T_1 of Ohran) in order to have been able to dynamically customize the size of the group update packets to match the bandwidth between the primary storage and secondary storage of modified Ohran (¶¶46-48). Such a modification would have reduced the bandwidth requirements of the backup/snapshot system of Ohran by sending larger update groups when bandwidth traffic is high and more frequent and smaller update groups when bandwidth traffic is lower, thereby optimizing the snapshot bandwidth - ¶¶44-46 of Ji.

the first update request of the first plurality of update requests in the first group having an order dependency relative to the second update request of the second plurality of update requests in the a second group (the plurality of update requests in the first group from

time T0-T1, or alternatively, when the predetermined size of the group has been reached as taught in ¶42 of Ji, has an order dependency relative to a second group of updates from T1-T2 as shown in figure 2 - the first group of updates occurs logically before the second group of updates as the second group of updates occur subsequent to the first group)

Ohran does not specifically teach **the update requests in each of the first and second groups capable of being processed concurrently and without regard for order relative to one another.** In other words, the update requests are processed asynchronously. Armangua teaches that the updates to a primary system can be performed asynchronously during snapshot processing [17/6-28]. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have combined the snapshot system of Ohran with the asynchronous processing of snapshot updates to a backup system of Armangua in order to have quickly processed the updates as the asynchronous processing does not have to wait for receipt confirmation that a track has been written, thereby speeding up the snapshot process.

Thus, the combination of Ohran and Armangua further teach:

concurrently completing the first plurality of update requests of the first group (snapshot update processing for the first group could have been processed asynchronously according to figures 8A or 8B of Armangua)**; and**

after concurrently completing the first plurality of update requests, concurrently completing the second plurality of update requests of the second group (it follows that after the first group of updates are completed that the second group of updates would be completed asynchronously as well when a second snapshot request is made at time T2 - figure 2 of Ohran).

As per claim 6, **wherein creating the first group further includes updating a status indicative of whether the first group is active** (when the snapshot bitmap contains any data, the Examiner is considering such a situation to designate the current group being "active" as the setting of a bit in the bitmap would indicate the presence of a new update - [9/63 - 10/8]).

As per claim 8, Ohran teaches **wherein concurrently completing the first plurality of update requests further includes issuing an update request of the first plurality of update requests** (update requests are issued to the backup system in order to persistently store the updated data - [10/32-44]).

As per claims 10 and 15, Ohran teaches **wherein concurrently completing the first plurality of update requests further includes holding the second update request of the second group from among the plurality of groups** (as shown in figure 2 of Ohran, the grayed region indicates that all updates to the original data must be held while designated data blocks that correspond to the previous group of update's requests are persisted with the previous snapshot data. Additionally, Ji teaches this feature as well in ¶¶40-42 where a second update can be held from the previous group of updates if the previous group of updates has reached batch capacity).

As per claim 11, Ohran teaches **wherein concurrently completing the second plurality of update requests subsequent update request further includes releasing a hold on the held second update request** (after the blocks corresponding to the previous group of update requests are persisted to snapshot storage, the system tracks changes to original data as shown in element 34 of figure 2 of Ohran. Ji also teaches such a feature in ¶41, where batches of updates are sent

in order such that a subsequent batch group of updates is held before a preceding group of updates is sent to the backup device).

As per claims 12 and 13, **wherein creating the first group, creating the second group, concurrently completing the first plurality of update requests and concurrently completing the second plurality of update requests subsequent update request further comprises creating the first group, creating the second group, completing the first plurality of update requests and completing the second plurality of update requests subsequent update request on a the primary system** (occurring when original data is overwritten - [9/63 - 10-8]) **and backup system** (when a snapshot occurs, original data is sent to the snapshot storage - figure 1, 16).

As per claim 14, **modified** Ohran teaches:

A method for updating data at a backup system that tracks updates made to a primary system, the method comprising:

synchronously processing a plurality of groups of update requests, a first update request from an application in a first group of update requests from among the plurality of groups having an order dependency relative to a second update request from the application in a second group of update requests from among the plurality of groups, with the update requests in each group being capable of being processed concurrently and without regard for order relative to one another, and wherein receipt of the second update request prior to processing of the first update request initiates the creation of the second group of update requests; and

asynchronously processing the update requests in each group.

The rejection follows the rejection for claim 1 above. Figure 2 of Ohran shows that the groups of updates are processed synchronously (according to a time when the updates are received, or alternatively by the amount of data contained in the batch update groups - ¶¶40-42 of Ji),and Armangua teaches that the updates of each group can be performed asynchronously during snapshot processing [17/6-28].

As per claim 36, modified Ohran further teaches **after completing the first plurality of update requests, arranging the second plurality of update requests of the group according to the order dependency** (figure 2)**.** As the order dependency only relates to the order of the groups of the requests, not specifically the requests contained in each group (see claim 1), Ohran, by default, teaches arranging the second group of requests (e.g. updates occurring to the original data from time T1-T2) as all of the second group of requests are arranged by order dependency to be processed after the first plurality of requests as shown in the timeline of figure 2.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohran (U.S. Patent No. 7,296,125) in view of Armangua et al. (U.S. Patent No. 6,549,992) in further view of Ji et al. (U.S. Patent Application Publication No. 2004/0250029) in further view of Yamagami (U.S. Patent Application Publication No. 2004/0268067) .

As per claim 3, modified Ohran does not specifically teach **wherein creating the first group further includes creating a group that includes a plurality of requests initiated at a plurality of applications.**

Yamagami teaches in ¶27 that one or more applications 112 are executing on the host that cause data to be modified. Claim 18 of Yamagami teaches that snapshot processing occurs to the

data store whose contents are written with the requests from the applications executing on the host. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have combined the modified snapshot system of Ohran with the teachings of applications creating the write requests on the primary system of Yamagami. Such a modification would have produced the predictable result of persisting all of the original data that was being overwritten by a plurality of applications on a primary volume to thereby backup the original data.

Claim 4, is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohran (U.S. Patent No. 7,296,125) in view of Armangua et al. (U.S. Patent No. 6,549,992) in further view of Ji et al. (U.S. Patent Application Publication No. 2004/0250029) in further view of Zait (U.S. Patent Application Publication No.2004/0210563).

As per claim 4, modified Ohran does not specifically teach **wherein creating the first group further includes updating a count associated with a number of the first plurality of update requests.** Zait teaches in ¶29 and ¶33 that the number of disk writes (e.g. "a count associated with the update requests") performed during a snapshot period can be tracked and included with snapshot information. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have combined the snapshot system of modified Ohran with the teaching of including a count with the snapshot data in order to have produced the predictable result of storing snapshot information/metadata along with the snapshot data itself.

Claims 7 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohran (U.S. Patent No. 7,296,125) in view of Armangua et al. (U.S. Patent No. 6,549,992) in further view of Ji et al. (U.S. Patent Application Publication No. 2004/0250029) in further view of Kapoor et al. (U.S. Patent Application Publication No. 2005/0021565).

As per claims 7 and 16, modified Ohran does not specifically teach **wherein creating the first group further includes assigning a group number to an each update request of the first plurality of update requests.** Kapoor teaches ¶43 that is common to assign each snapshot a unique version number. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have combined the modified snapshot system of Ohran with the teaching of snapshot version number sequencing of Kapoor in order to have produced the predictable result of assigning a sequence number to each snapshot taken by the system of modified Ohran. Such a modification would have associated a unique number to each snapshot data set taken of Ohran in order to easily discern older snapshots from newer snapshots or just be able to uniquely identify each snapshot data set.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohran (U.S. Patent No. 7,296,125) in view of Armangua et al. (U.S. Patent No. 6,549,992) in further view of Ji et al. (U.S. Patent Application Publication No. 2004/0250029) in further view of Golds et al. (U.S. Patent No. 6,647,473).

As per claim 9, modified Ohran does not specifically teach **wherein creating the first group further includes reading a group number from an update request of the plurality of update requests.** Golds teaches that update requests (flush and hold messages which cause

updated data to be flushed from a cache and stored to a primary volume) may be associated with a unique snapshot group number (GUID) - [6/36-51]. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have combined the modified snapshot system of Ohran with the teaching of using a group number from an update request when processing a system snapshot. Such a modification would have produced the predictable result of snapshot coordination between the update requests and the snapshot request.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SHANE M. THOMAS whose telephone number is (571) 272-4188. The examiner can normally be reached M-F 8:30 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt M. Kim can be reached at (571) 272-4182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Shane M. Thomas/ 11 September 2008

Patent Examiner